What is claimed:

1. A catalytic composition comprising: a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said composition having an ammonia desorption peak at a temperature greater than 100°C.

2. The catalytic composition of claim 1, wherein said metal is selected from the group consisting of titanium, tantalum, niobium, zirconium, hafnium, molybdenum, vanadium and tungsten.

3. The catalytic composition of claim 1, wherein said nanostructures are substantially cylindrical, have graphitic layers concentric with their cylindrical axes and are substantially free of pyrolytically deposited carbon.

4. The catalytic composition of claim 1, wherein said composition includes 10% to 95% carbides by weight thereof.

5. The catalytic composition of claim 4, wherein said composition includes 0.5% to 25% oxycarbides by weight of total carbides.

6. The catalytic composition of claim 1, wherein said catalytic composition is bifunctional.

7. A catalytic composition comprising: a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said nanostructures having been modified by an acidification treatment.

8. The catalytic composition of claim 7, wherein said metal is selected from the group consisting of titanium, tantalum, niobium, zirconium, hafnium, molybdenum, vanadium and tungsten.

9. The catalytic composition of claim 7, wherein said acidification treatment is treatment with an acidifying compound.

10. The catalytic composition of claim 9, wherein said acidifying compound includes an element selected from the group consisting of bromine, chlorine, fluorine, iodine, nitrogen, phosphorus, oxygen, sulfur and any combination thereof.

11. The catalytic composition of claim 10, wherein said acidification treatment is selected from the group consisting of halogenation, chlorination, nitrogenation, oxygenation, and phosphorylation.

12. The catalytic composition of claim 7, wherein said nanostructures are substantially cylindrical, have graphitic layers concentric with their cylindrical axes and are substantially free of pyrolytically deposited carbon.

13. The catalytic composition of claim 7, wherein said composition includes 10% to 95% carbides by weight thereof.

14. The catalytic composition of claim 13, wherein said composition further includes 0.5% to 25% oxycarbides by weight total carbides.

15. The catalytic composition of claim 7, wherein said catalytic composition is bifunctional.

16. A catalytic composition comprising:

(a) a rigid porous structure formed from a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said rigid porous structure including a plurality of interstitial spaces between said nanostructures; and

(b) a solid acid in said interstitial spaces.

17. The catalytic composition of claim 16, wherein said metal is selected from the group consisting of titanium, tantalum, niobium, zirconium, hafnium, molybdenum, vanadium and tungsten.

18. The catalytic composition of claim 16, wherein said nanostructures are substantially cylindrical, have graphitic layers concentric with their cylindrical axes and are substantially free of pyrolytically deposited carbon.

19. The catalytic composition of claim 16, wherein said solid acid is a compound containing an element selected from the group consisting of aluminum and zirconium.

20. The catalytic composition of claim 19, wherein said solid acid is a compound containing aluminum and the solid acid has been chlorinated, sulfated, or phosphated.

21. The catalytic composition of claim 19, wherein said solid acid is a compound containing zirconium and the solid acid has been chlorinated, sulfated, or phosphated.

22. The catalytic composition of claim 16, wherein said rigid porous structure has a density greater than about 0.5 gm/cm^3 and a porosity greater than about 0.8 cc/gm.

23. The catalytic composition of claim 22, wherein said rigid porous structure is substantially free of micropores and has a crush strength greater than about 1 lb/in^2.

24. The catalytic composition of claim 16, wherein said composition includes 10% to 95% carbides by weight thereof.

25. The catalytic composition of claim 24, wherein said composition includes 0.5% to 25% oxycarbides by weight total carbides.

26. The catalytic composition of claim 16, wherein said composition is bifunctional.

27. A process of preparing a catalytic composition for conducting a fluid phase catalytic reaction comprising the step of: acidifying a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide.

28. The process of claim 27, wherein acidifying said nanostructures comprises using an acidifying compound containing an element selected from the group consisting of bromine, chlorine, fluorine, iodine, nitrogen, phosphorus, sulfur, oxygen and mixtures thereof.

29. The process of claim 28, wherein acidifying said nanostructures further comprises placing said nanostructures in a reactor; and drying said nanostructures.

30. The process of claim 29, wherein acidifying said nanostructures further comprises passivating the plurality of nanostructures with oxygen.

31. The process of claim 27, wherein acidifying said nanostructures is achieved by chlorination, nitration, sulfation, or phosphorylation.

32. A process of preparing a catalytic composition for conducting a fluid phase catalytic reaction comprising the step of: incorporating a solid acid within the plurality of interstitial spaces within a composition including a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide.

33. The process of claim 32, further comprising passivating said composition with oxygen.

34. The process of claim 32, wherein said solid acid is a compound containing an element selected from the group consisting of aluminum and zirconium.

35. The process of claim 34, wherein said solid acid is a compound containing aluminum and said solid acid has been chlorinated, sulfated, or phosphated.

36. The process of claim 34, wherein said solid acid is a compound containing zirconium and said solid acid has been chlorinated, sulfated, or phosphated.

37. A method for the isomerization of a hydrocarbon comprising the step of: contacting a feed stream including a hydrocarbon under isomerization conditions with a composition, said composition including a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said composition having an ammonia desorption peak at a temperature greater than 100°C.

38. The method of claim 37, wherein said hydrocarbon is selected from the group consisting of normal, branched, and cyclic hydrocarbons.

39. The method of claim 37, wherein said hydrocarbon is an alkene.

40. The method of claim 37, wherein said isomerization conditions include a temperature from 100 °C to 400°C, a molar ratio of hydrocarbon to hydrogen of 1:16 to 1:4, a pressure from about 1 to 10 psi, and a WHSV from 1 to 10 h^{-1}.

41. A method for the isomerization of a hydrocarbon comprising the step of: contacting a feed stream including a hydrocarbon under isomerization conditions with a composition, said composition including a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said nanotubes having been modified by an acidification treatment.

42. The method of claim 41, wherein said hydrocarbon is selected from the group consisting of normal, branched, and cyclic hydrocarbons.

43. The method of claim 41, wherein said hydrocarbon is an alkene.

44. The method of claim 41, wherein said isomerization conditions include a temperature from 100 °C to 400°C, a molar ratio of hydrocarbon to hydrogen of 1:16 to 1:4, a pressure from about 1 to 10 psi, and a WHSV from 1 to 10 h^{-1}.

45. The method of claim 41, wherein said acidification treatment is treatment with an acidifying compound.

46. The method of claim 45, wherein said acidification treatment is selected from the group consisting of halogenation, chlorination, nitrogenation, oxygenation, and phosphorylation.

47. A method for the isomerization of a hydrocarbon comprising the step of: contacting a feed stream including a hydrocarbon under isomerization conditions with a composition, said composition including: (a) a rigid porous structure formed from a plurality of nanostructures selected from the group consisting of carbon nanotubes, carbide nanorods, and mixtures thereof, each having a substantially uniform diameter between 1 nm and 100 nm and a length to diameter ratio greater than 5, said nanostructures further including a metal carbide selected from the group consisting of carbides and oxycarbides of a transition metal, rare earth metal or actinide, said rigid porous structure including a plurality of interstitial spaces between said nanostructures; and (b) a solid acid in said interstitial spaces.

48. The method of claim 47, wherein said hydrocarbon is selected from the group consisting of normal, branched, and cyclic hydrocarbons.

49. The method of claim 47, wherein said hydrocarbon is an alkene.

50. The method of claim 47, wherein said isomerization conditions include a temperature from 100 °C to 400°C, a molar ratio of hydrocarbon to hydrogen of 1:16 to 1:4, a pressure from about 1 to 10 psi, and a WHSV from 1 to 10 h^{-1}.

51. The method of claim 47, wherein said solid acid is a compound containing an element selected from the group consisting of aluminum and zirconium.

52. The method of claim 51, wherein said solid acid is a compound containing aluminum and the solid acid has been chlorinated, sulfated, or phosphated.

53. The method of claim 51, wherein said solid acid is a compound containing zirconium and the solid acid has been chlorinated, sulfated, or phosphated.

54. The method of claim 47, wherein said rigid porous structure has a density greater than about 0.5 gm/cm^3 and a porosity greater than about 0.8 cc/gm.

55. The method of claim 54, wherein said rigid porous structure is substantially free of micropores and has a crush strength greater than about 1 lb/in^2.